

I claim:

1. A power generation system for supplying power to an external load,
comprising:

- 5 (a) a fuel cell characterized by operating parameters that are controllable to
control output power provided by the fuel cell;
(b) a switch coupled to an output of the fuel cell;
(c) an energy storage device coupled to the output of the switch; and
(d) a controller coupled to the fuel cell and switch, wherein the operating
parameters and switch are controllable to control the output power provided from the
10 fuel cell to energy storage device.

2. A system as recited in claim 1, further comprising an internal auxiliary load,
wherein the energy storage device is configured to provide power to the internal
auxiliary load without said power being provided through a power conditioner that is
15 also providing external load power.

3. A system as recited in claim 1, further comprising a power conditioner
coupled to the output of the battery.

20 4. A system as recited in claim 1, wherein the energy storage device is a
battery.

5. A system as recited in claim 1, wherein the energy storage device is a
capacitor.
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6. A system as recited in claim 1, wherein the fuel cell operating parameters
include temperature.

7. A system as recited in claim 1, wherein the fuel cell operating parameters
30 include air flow.

8. A system as recited in claim 1, wherein the fuel cell operating parameters
include fuel concentration.

9. A system as recited in claim 1, wherein the fuel cell operating parameters include air pressure.

10. A system as recited in claim 1, wherein the fuel cell operating parameters
5 include fuel pressure.

11. A system as recited in claim 1, wherein the power conditioner comprises an inverter.

10 12. A system as recited in claim 1, wherein the power conditioner comprises a dc-to-dc converter.

13. A system as recited in claim 4, wherein the maximum output voltage of the fuel cell when the fuel cell can produce a non-negligible amount of power is near or
15 below the nominal battery voltage.

14. A method for operating a power generation system for supplying power to a load, the power generation system including a fuel cell characterized by operating parameters that are controllable to control output power provided by the fuel cell, a
20 switch coupled to an output of the fuel cell, and an energy storage device coupled to the output of the switch, comprising: holding the voltage at the output of the switch nearly constant with the energy storage device; and controlling the switch and operating parameters of the fuel cell to control the output power provided from the fuel cell to the energy storage device.

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15. A method as recited in claim 14, wherein the energy storage device is used to provide power to an internal auxiliary load and an external load without said internal auxiliary power being provided through a power conditioner that also provides power to the external load.

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16. A method as recited in claim 14, wherein a power conditioner provides power from the energy storage device to an external load.

17. A method as recited in claim 14, wherein the energy storage device is a battery.

18. A method as recited in claim 14, wherein the controlled fuel cell operating
5 parameters include temperature.

19. A method as recited in claim 14, wherein the controlled fuel cell operating
parameters include air flow.

10 20. A method as recited in claim 14, wherein the controlled fuel cell operating
parameters include fuel concentration.

21. A method as recited in claim 14, wherein the controlled fuel cell operating
parameters include air pressure.
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22. A method as recited in claim 14, wherein the controlled fuel cell operating
parameters include fuel pressure.

23. A method as recited in claim 16, wherein the power conditioner comprises
20 an inverter.

24. A method as recited in claim 16, wherein the power conditioner comprises
a dc-to-dc converter.

25 25. A method as recited in claim 17, wherein the maximum output voltage of
the fuel cell when the fuel cell can produce a non-negligible amount of power is near
or below the nominal battery voltage.

26. A power conversion system for supplying power to an external load,
30 comprising:

- (a) a fuel cell characterized by operating parameters that are controllable to
control output power provided by the fuel cell;
- (b) a switch coupled to an output of the fuel cell;

(c) an energy storage device coupled to the load, wherein the energy storage device is configured to provide power to the internal auxiliary load without said power being provided through the power conditioner; and

(d) a controller coupled to the fuel cell and switch, wherein the fuel cell's operating parameters and the switch are controllable to control the output power provided from the fuel cell.

27. A system as recited in claim 26, further comprising a power conditioner comprising an input coupled to the switch and an output for providing power to the load.

28. A system as recited in claim 27, further comprising an internal auxiliary load, wherein the voltage at the input to the power conditioner is held nearly constant by the energy storage device, and wherein the energy storage device is configured to provide power to the internal auxiliary load without said power being provided through the power conditioner.

29. A system as recited in claim 26, wherein the energy storage device is a battery.

30. A system as recited in claim 26, wherein the energy storage device is a capacitor.

31. A system as recited in claim 26, wherein the fuel cell operating parameters include temperature.

32. A system as recited in claim 26, wherein the fuel cell operating parameters include air flow.

33. A system as recited in claim 26, wherein the fuel cell operating parameters include fuel concentration.

34. A system as recited in claim 26, wherein the fuel cell operating parameters include air pressure.

35. A system as recited in claim 26, wherein the fuel cell operating parameters include fuel pressure.

5 36. A system as recited in claim 27, wherein the power conditioner comprises an inverter.

37. A system as recited in claim 27, wherein the power conditioner comprises a dc-to-dc converter.

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38. A system as recited in claim 26, wherein the maximum output voltage of the fuel cell when the fuel cell can produce a non-negligible amount of power is near or below the nominal voltage of the energy storage device.

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